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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,146	08/04/2003	Brian G. Johnson	ITO.0549US (P16246)	5099
21906	7590	10/20/2006	EXAMINER	
TROP PRUNER & HU, PC 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631			WEINBERG, MICHAEL J	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/634,146

Applicant(s)

JOHNSON, BRIAN G.

Examiner

Michael J. Weinberg

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/31/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-10 and 12-36 is/are rejected.
- 7) ☒ Claim(s) 6-9 and 12-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. An amendment was filed on 8/31/2006. The specification has been acceptably amended. Claims 1, 10, 14, 21, 23, 31, and 32 have been amended. Claim 11 has been cancelled, leaving claims 1-10 and 12-36 pending. New grounds of rejection follow, necessitated by the amendment.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 11/7/2003 was filed after the mailing date of the application on 8/4/2003. The examiner has considered the information disclosure statement. However, as there appears to have been a scanning or printing problem, reference "L" has not officially been considered. The listing is not in compliance with 37 CFR 1.98(b)(5) as the complete title, page numbers, date, and publisher have been cut off. Accordingly, it is requested of the applicant to furnish a new IDS for this reference.

Claim Objections

3. Claims 6-9 and 12-31 are objected to because of the following informalities:

In claims 12 and 23, "light-accessible" should be "light-programmable" to match the amendments to the other independent claims. Otherwise, the rejections made in the previous office action stand, in addition to the rejections below.

In claims 6 and 20, "accessed" should possibly be "programmed" to agree with the independent claims.

In claims 18 and 19, "light transmissive" should be "light-transmissive".

Other claims are objected to as being dependent from objected claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 10, 12, 13, 21, 22, and 32 are rejected under 35 U.S.C. 102(a) or 102(e) as being anticipated by Nangle (US Patent 7,106,622, originally published on 7/10/2003).

With regard to **claims 1, 12, and 32**, Nangle discloses a method enabling optical and electrical access and a device comprising (see abstract):

a light-programmable phase change material 102 (see figure 1 which shows laser 108 programming cells 102); and

a circuit 104 to electrically program said phase change material (col 2, line 10 and col. 4).

With regard to **claim 10**, Nangle further discloses a method including using a phase change memory to convert an optical signal to an electrical signal. (The abstract describes the pre-programming by energy/laser beam and that the memory may be electrically read, thus converting from optical signals to electrical signals.)

With regard to **claim 13**, Nangle further discloses a memory wherein said phase change material is chalcogenide. (col. 2, line 1)

With regard to **claim 21**, Nangle further discloses a memory of claim 12 including a plurality of cells 102 each including phase change material (figure 1 and abstract), and

an optical system (comprising laser beam 108 and scanning laser controller 106) to individually expose one memory cell of the plurality of memory cells to a laser light 108. (col. 2, lines 37-55)

With regard to **claim 22**, Nangle further discloses a memory wherein said circuit includes an addressing circuit (see figure 4, for example).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-9, 14-19, and 33-36 rejected under 35 U.S.C. 103(a) as being unpatentable over Nangle (US Patent 7,106,622, used above) in view of Lu et al (US Patent 6,850,432, cited previously).

With regard to **claims 2-9, 14-19, and 33-36**, Nangle discloses all of the limitations of claims 1, 12, and 32, as shown above, but does not teach the specific structure or makeup of the phase change memory cell 102.

However, as shown below, Lu discloses all the limitations in claims 2-9, 14-19, and 33-36 that are untaught in Nangle. In fact, many of the features of Lu and Nangle overlap. Thus, it would have been obvious to one of ordinary skill in the art at the time of

the invention to add the structure and makeup of the cells of Lu to the invention of Nangle. Motivations for the combination include, *inter alia*, allowing the phase change cells to be both light-accessible and protected by glass while still allowing electrical access.

With regard to **claims 2, 3, 14, 33, and 34**, Lu teaches a method composed of forming a device with a pair of parallel spaced electrodes (word lines 126 and conducting plug 122) and a phase change material 124 between said electrodes, the phase change material and said electrodes being arranged laterally. (see figure 1 and col. 4, lines 9-40)

With regard to **claims 4, 5, 18, 19, 35, and 36**, Lu further discloses a device allowing a method enabling light exposure of said phase change material through a thermally insulating material 128 (glass which is an oxide SiO_2). (col. 4, lines 35-36)

With regard to **claim 6**, Nangle (Lu also, as shown in the previous office action) further discloses a method including enabling said phase change material (in cells 102) to be electrically accessed (see abstract) through rows and columns. (see figure 4- Addressing circuitry, as is well-known in the art, is attached to rows and columns.)

With regard to **claims 7 and 15**, Nangle (Lu also, as shown in the previous office action) further discloses a method and device including locating rows and columns to enable light access to said cells 102. (see figure 1 which shows laser 108 programming cells 102 and col. 2, lines 48-55)

With regard to **claim 8 and 16**, Lu further discloses a method used in a device including a positioning one of said rows 126 and columns 118 below said phase change material 124. (The "one" depends on the orientation of the memory.)

With regard to **claims 9 and 17**, Lu further discloses a method used in a device including providing a via coupling one of said electrodes to said underlying row 126 or column 118. (As a via is simply a through connection to another layer, this could comprise 1 or more of plug 122, and layers 114, 116, and 118 in figure 1).

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nangle in view of Walt (US Patent 6,999,657 with priority back to 5/28/2003).

With regard to **claim 20**, Nangle discloses the memory of claim 12 but does not teach a micro-mirror to optically access said phase change memory material.

However, Walt does teach that micro-mirror arrays are commonly used to access optically memories. (column 19, lines 15-42)

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the mirrors of Walt with the memory of Lu in order to accurately reflect laser light into the array to program cells.

8. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nangle in view of Wicker (US Patent 6,867,425, cited in the previous office action).

With regard to **claim 23**, Nangle discloses a semiconductor memory including a light-accessible phase change material (see abstract and light-producing laser beam 108 in figure 1) and a circuit 104 to electrically access said phase change material (abstract). Nangle does not teach other limitations of claim 23, as shown below.

With regard to **claim 24**, Nangle further discloses a memory wherein said phase change material is chalcogenide. (col. 2, line 1)

With regard to **claims 23-24**, Nangle does not teach that the memory is coupled to the processor-based device in a system comprising:

a processor-based device; and

a wireless interface coupled to said processor-based device;

Wicker, however, does teach a well-known system (figure 16) comprising a processor-based device 910 coupled to a similar phase change memory 100/930 (col. 10, lines 23-35) and a wireless interface 940 (col. 10, lines 36-42).

Thus, it would have been obvious to one of ordinary skill in the art to combine the system of Wicker with the memory of Lu in order to save power by using Lu's energy efficient phase change memory.

9. Claims 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nangle in view of Wicker (US Patent 6,867,425, cited in the previous office action) and further in view of Lu.

With regard to **claims 25-31**, Nangle and Wicker disclose all of the limitations of claim 23, as shown above, but they do not teach the specific structure or makeup of the phase change memory cell 102.

However, as shown below, Lu discloses all the limitations in claims 25-31 that are untaught in Nangle and Wicker. In fact, many of the features of Lu and Nangle overlap. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the structure and makeup of the cells of Lu to the combination of

Nangle and Wicker. Motivations for the new combination include, *inter alia*, allowing the phase change cells to be both light-accessible and protected by glass while still allowing electrical access.

With regard to **claim 25**, Lu teaches a pair of spaced electrodes (word lines 126 and conducting plug 122), said phase change material 124 between said electrodes. (see figure 1 and col. 4, lines 9-40)

With regard to **claim 26**, Lu teaches (figure 1) a substrate 110, said phase change material 124 positioned over said substrate 110 such that the length of said phase change material 124 is generally parallel to said substrate.

With regard to **claim 27**, Lu further teaches a first set of conductors 118 and a second set of conductors 126, said second set of conductors being generally transverse to said first set of conductors. (fig 2)

With regard to **claim 28**, Lu further teaches that said first 118 and second 126 sets of conductors are arranged to avoid blocking light access to said phase change material 124. (col. 9, lines 25-31)

With regard to **claim 29**, Lu further teaches that one of said sets of conductors (122 or 126 depending on orientation of the cell) is arranged beneath said phase change material 124.

With regard to **claim 30**, Lu further teaches that a via (at least one of 122, 114, 116, and 118) extends from one of said electrodes 122 to an underlying conductor 118.

With regard to **claim 31**, Lu further teaches a substantially light transmissive material 128 (ie glass) over said phase change material 124. (col. 4, lines 35-36)

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US PG Pub 2003/0128646 is another application of Nangle with both electrical and optical programming of a phase change memory.

US Patent 6,005,791 shows a memory that may be electrically or optically programmed (see abstract).

US 5,335,219 provides a relevant discussion of phase change memory.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Weinberg whose telephone number is 571-272-6424. The examiner can normally be reached on M-F 9:00 am-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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